WORK PERMIT # _____

ILR / Work Order # _____ **Dept.** AC **Construction Job #** _____ **Tracking #** 08A 025 **Account #** 89195

1. Work requester fills out this section

Requester: J. Collins Date: 8-12-98 Dept/Div/Group: PHENIX

Other Contact person (if different from requester): KEN JONES Phone No. _____

Start Date 8-19-98 Estimated End Date _____

Description of Work / Problem: ROTATE RICH DETECTOR

Building 832 Room High Bay Equipment _____

2. Work requester, work provider, and ES&H (as necessary) jointly fill out this section or attach applicable hazard analysis

Hazard Analysis

RADIATION CONCERNS
[✓] NONE [ ] Activation [ ] Airborne [ ] Contamination [ ] Radiation [ ] OTHER _____
[ ] Special nuclear materials involved (ES&H 3.7.0), notify Group Leader, Isotope Special Materials Group (SSD)
[ ] Fissionable materials involved (ES&H 3.7.0), notify Laboratory Criticality Officer (DAT)

SAFETY CONCERNS

[ ] NONE	[ ] Corrosive	[ ] Flammable	[✓] Material Handling	[✓] Rigging/Critical Lift
[ ] Asbestos	[ ] Cryogenic	[ ] Fumes/Mist/Dust	[ ] Noise	[ ] Toxic
[ ] Biohazard	[ ] Electrical	[ ] Heat/Cold Stress	[ ] Non-ionizing Radiation	[ ] Vacuum
[ ] Chemicals	[✓] Elevated Work	[ ] Hydraulic	[ ] Oxygen Deficiency	[ ] OTHER _____
[ ] Confined Space	[ ] Excavation	[ ] Lasers	[ ] Penetrating Fire Wall	
[ ] Adding / Removing Walls or Roofs		[ ] Lead	[ ] Pneumatic	

ENVIRONMENTAL CONCERNS
[✓] NONE
[ ] OTHER _____
[ ] Hazardous materials will be released to the air via a new/modified ventilation system, hood, or stack (ES&H 6.1.4 and 6.1.5) Notify Project Engineer, Environmental Protection Office (ES&H Services)
[ ] New hazardous materials will be released via the liquid effluent system to the sewage treatment system or an impoundment (ES&H 6.1.2) Notify Regulatory Compliance Engineer, Environmental Protection Office (ES&H Services) for permit.

Waste Generated [✓] NONE [ ] Clean Waste [ ] Hazardous Waste [ ] Radioactive Waste [ ] Mixed Waste
Waste disposition by: _____

Based on analysis above, the Review Team determines the job hazard category:

JOB HAZARD CATEGORY: X MODERATE ___ HIGH

Job Safety Analysis (JSA) Required? ___ No X Yes (Please attach)

Work Controls

WORK PRACTICES
[✓] NONE [ ] Containment [ ] IH Survey [ ] Scaffolding - requires inspection
[ ] Back-up Person/Watch [ ] Exhaust Ventilation [ ] Lockout/Tagout [ ] Time Limitation
[ ] Barricades [ ] HP Coverage [ ] Posting/Warning Signs [ ] OTHER _____

PROTECTIVE EQUIPMENT

[ ] NONE	[ ] Ear Plugs	[✓] Gloves	[ ] Lab Coat	[✓] Safety Glasses
[ ] Coveralls	[ ] Ear Muffs	[ ] Goggles	[ ] Respirator	[ ] Safety Harness
[ ] Disposable Clothing	[ ] Face Shield	[✓] Hard Hat	[ ] Rubbers	[✓] Safety Shoes [ ] OTHER _____

PERMITS REQUIRED *Initial next to box to show who has responsibility to generate the permit*
[ ] Confined Space Entry (ES&H 2.2.4) [ ] Digging/Core Drilling(ES&H 1.18.0) [ ] Impair Fire Protection Sys. (ES&H 4.2.0)
[ ] Cutting/Welding (ES&H 4.3.0) [ ] Electrical Working Hot (ES&H 1.5.0) [ ] Rad Work Permit (BNL RadCon Manual)
[ ] Dept/Div Specific Permit _____ [ ] Dept/Div Specific Permit _____

DOSIMETRY/ MONITORING
[✓] NONE [ ] O_2/Combustible Gas [ ] Self-reading Dosimeter
[ ] Heat Stress Monitor [ ] Passive Vapor Monitor [ ] Sorbent Tube/Filter Pump
[ ] Noise Survey/Dosimeter [ ] Real Time Monitor [ ] TLD [ ] OTHER _____

Training Requirements (List below any location specific training requirements)

3. Both work requester and work provider coordinate on work plan (use attachments for detailed plans)

Work Plan (procedures, timing, personnel, etc.): SEE ATTACHED.

Special Working Conditions Required:

Operational Limits Imposed:

Post Work Testing Required:

Reviewed By: **Note: Primary facility reviewer will dictate the other required signatures*

Title	Name (print)	Signature	Life #	Date
Primary Reviewer	T. Collins		14795	8-12-98
ES&H Services	S. KANE		19894	8/27/98
Other *	T. O'MALLEY		21336	8-14-98

4. Job site personnel fills out this section

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements

Job Site Supervisor _____ Contractor Supervisor _____

Workers:	Life #	Workers:	Life #

5. Work Requester or designee fills out this section

Conditions are Appropriate to Start Work: (Work permit has been reviewed, work controls are in place, and site is ready for job.)

Name _____ Signature _____ Life # _____ Date _____

6. Work Requester determines if Post Job Review is required

____YES ____NO

Post Job Review by ES&H Coordinator: _____ Life #: _____ Date: _____

	Name	Initial		
Other Closeout Signatures (as necessary):			Life #:	Date:
Other Closeout Signatures (as necessary):			Life #:	Date:

7. Worker provides feedback

Worker Feedback:

Supervisor: Is worker feedback required on this job? ____NO ____YES (attach feedback form)

Worker: Any feedback on safety concerns or on ways to improve the job? ____NO ____YES (ask for form if not attached)

FLORIDA STATE UNIVERSITY
NUCLEAR PHYSICS DEPARTMENT

RICH PROJECT

GAS VESSEL HANDLING:
Equipment & Pivot Procedures
FSU-RP-P05

Florida State University
Tallahassee, FL 32306
(850) 644-4100

GAS VESSEL HANDLING:
Equipment & Pivot Procedures

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II. SCOPE
III. RESPONSIBILITIES
IV. PRE-PIVOT PROCEDURE
V. PIVOT PROCEDURE
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Reference documents.

Ref drawings 0020207019.
Lifting Fixture Load test data.

I. INTRODUCTION

This procedure is for the safe handling of the Rich Gas Vessel while pivoting into the mirror alignment position, using the Rich Gas Vessel Lifting Fixture. It will eliminate danger to workers at Brookhaven National Laboratory (BNL). This procedure will provide detailed instructions for pivoting and securing vessel in the alignment position.

II. SCOPE

This procedure gives the minimum requirements for pivoting the gas vessel into its alignment position. It applies to BNL personnel, outside contractors, contract labor and to personnel designated to operate equipment covered by this procedure. Safety standards provided by BNL for Material Handling.

III. RESPONSIBILITY

1. Florida State University (FSU): A qualified representative of FSU will be on site as a consultant during the following operations

2. BNL: BNL will provide appropriate personnel for hoisting, rigging, crane operation, line supervision, and the appropriate equipment with verifications for the following operation:

   Equipment BNL should provide:
   Crane hook in building 832, rated for 25,000 lb. min
   Four12' long slings, rated for 25.000 lb. min (to lift gas vessel).
   Two 10,000 lb. chain falls.
   Hardware to connect slings to crane hook.
   Shackles rated 20,000 min
   Spreader bar rated for 15 tons
   Rich lifting fixture
   Load cell

IV. PRE-LIFTING PROCEDURE

1. Check toque values on 1"8 bolts attaching transition plates to vessel (160 ft LB). Check toque values on 1"-8 bolts Rich lifting fixture to transition plates (220 ft lb.) (Fig 1).
2. Check bolts in floor stands are tightening to correct values.
3. Remove roof section of tent above Rich gas vessel.
4. Make sure area around the rich is clear
5. Check for tools and any loose parts in the PMT arrays and vessel in general.

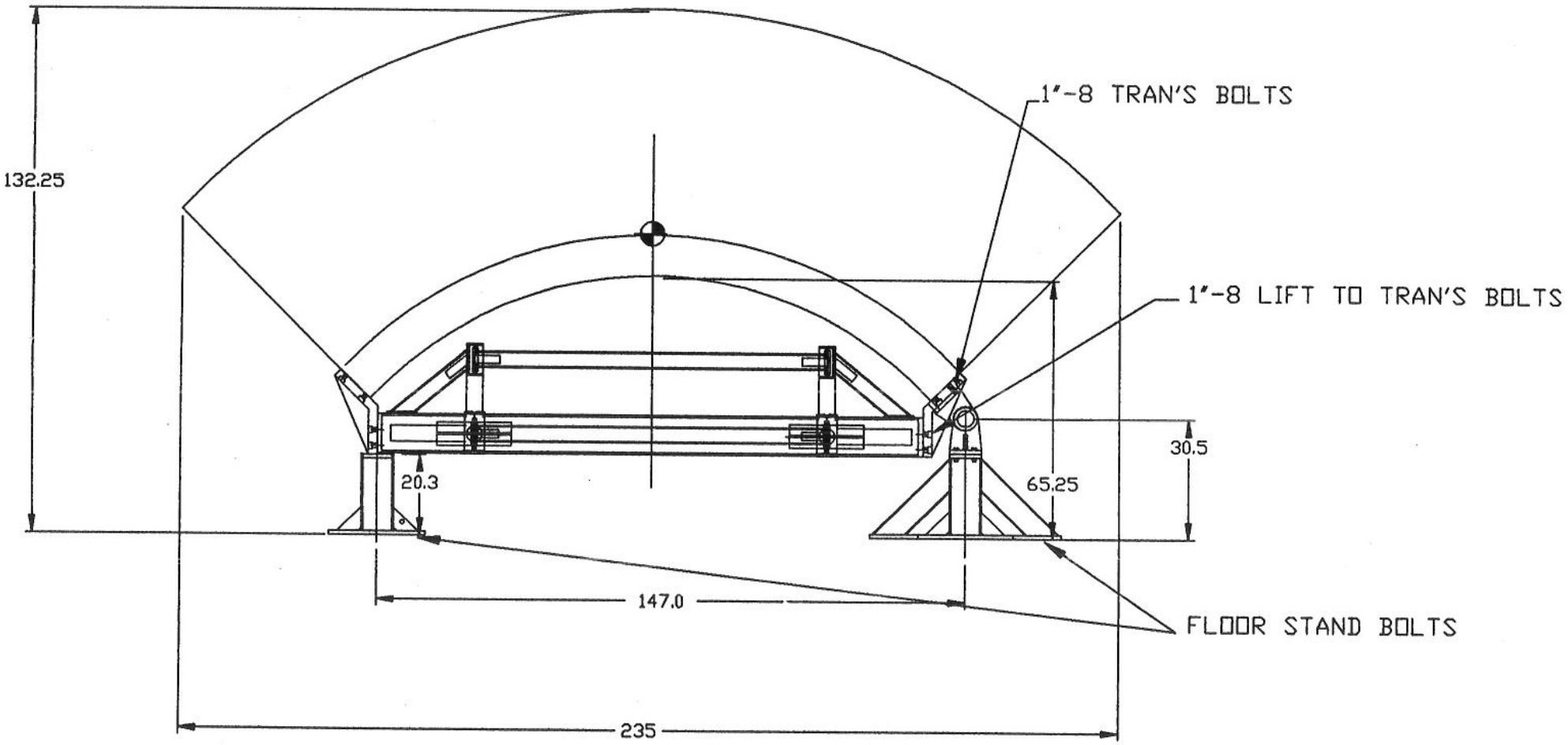
V. PIVOTING PROCEDURE

1. Move crane into position to pick up15 ton spreader bar, hook load cell between hook and spreader bar.
2. Move spreader bar through roof opening in tent to a position to Attach12' slings and shackles to ends of spreader bar (See Fig 2).
3. Attach 12' slings to top end of lifting frame
4. Attach chainfalls and slings to top end of lifting frame
5. Leave chainfalls and chain fall slings loose (See Fig 2).
6. Start lift as vessel razes Move Bridge to the east (See Fig 3).
7. Move concrete blocks into position and attach chainfalls and slings. (See Fig 4).
8. Continue to raze vessel with crane, moving bridge to the east and keeping chain falls loose.
9. Take up on chain fall as vessel approaches pivot pinot (See Fig 4).
10. Check load cell as vessel weight goes over pivot point
11. The crane must not exceed this point (See Fig 5).
12. Eases down on chainfall keeping crane hook taught till vessel rests on back mounts.

VI. REMOVAL OF LIFTING FIXTURE

1 Attach chainfalls on lower host rings with crane in same position (See Fig 6)
2 Attach slings and chainfalls to crane hook.
3. Take up on chainfalls till tight, this is to keep the frame from swinging out from the gas vessel in an uncontrolled manner.
4. Attach guidelines to lifting frame.
5. Remove 1" 8 bolts from top transition plates (See Fig 6).
6. Remove 1"-8 bolts from bottom lifting frame at the transition plate connection leaving transition plate attach to vessel. (See Fig 6).
7. At this time lifting fame will be free of gas vessel.
8. Raze crane hook and move to the west moving frame away from the gas vessel, lower frame to the ground and remove from area (See Fig 6).
9. Vessel is now ready for mirror alignment.

Fig 1



RICH IN PMT AND MIRROR INSTAL TION POSITION
WITh .IFTING FRAME AND TRANSITION PLATES INSTALED

FIG 2

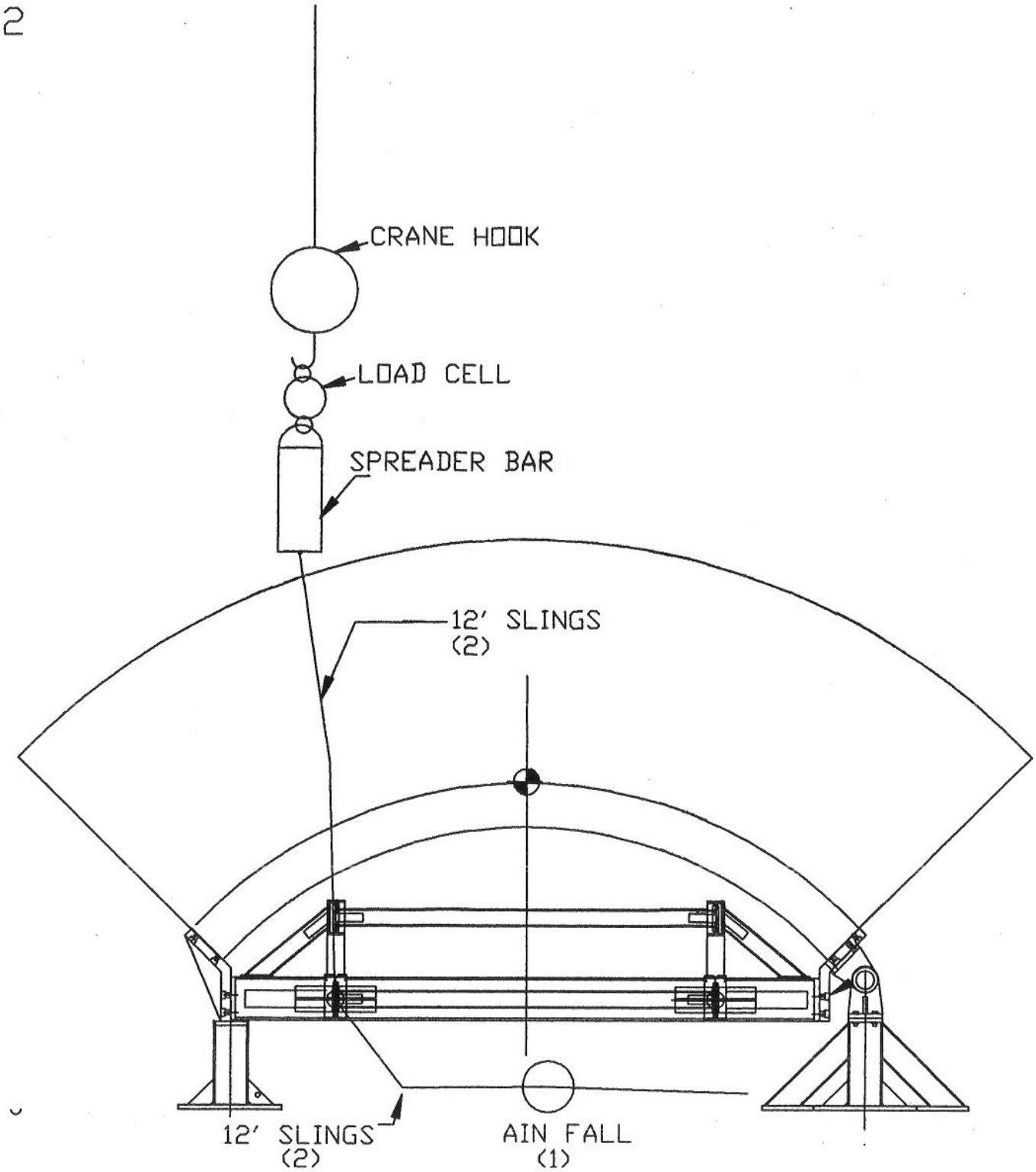

CRANE HOOK
LOAD CELL
SPREADER BAR
12' SLINGS
(2)
12' SLINGS
(2)
AIN FALL
(1)

FIG 3

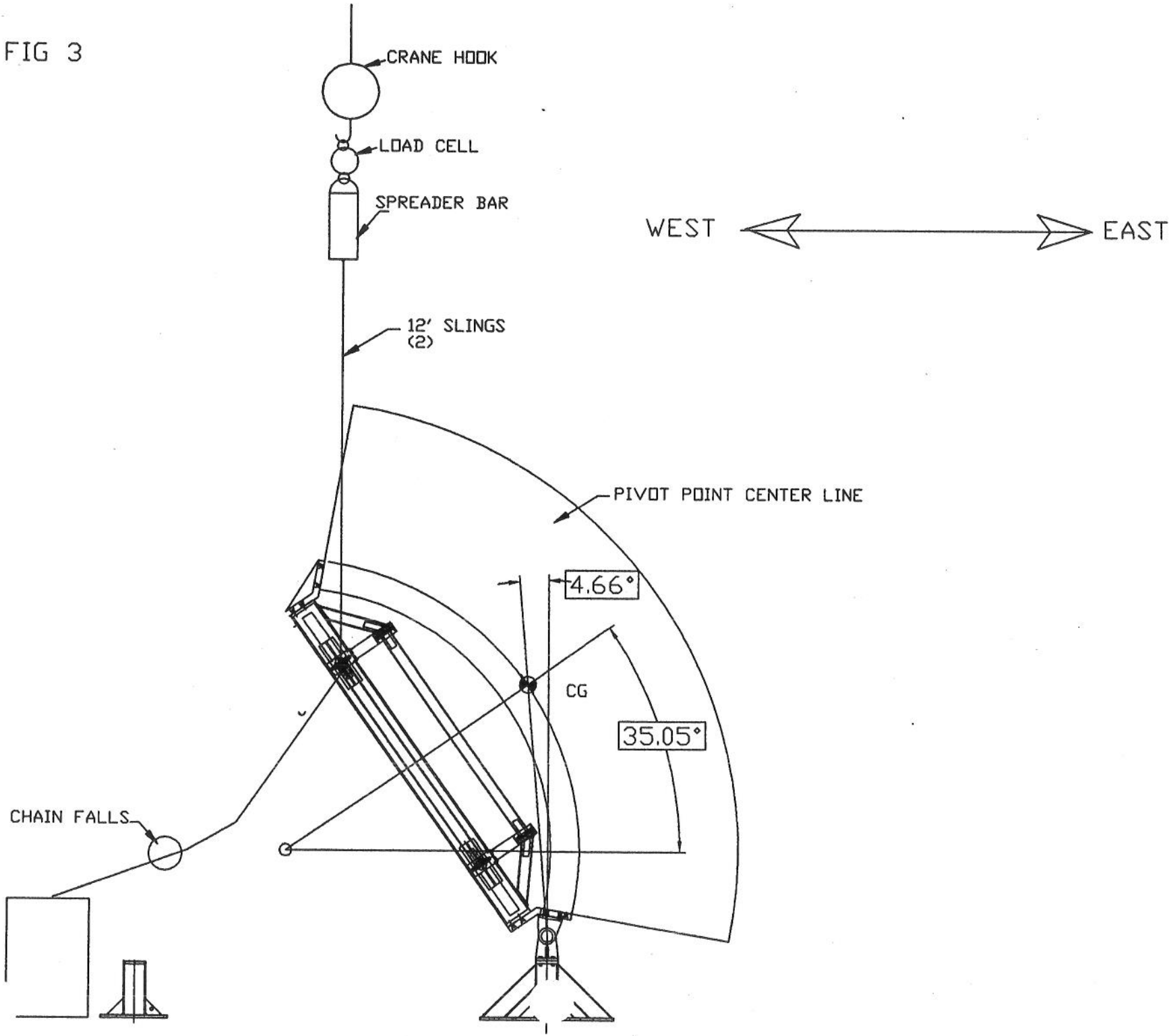

CRANE HOOK
LOAD CELL
SPREADER BAR
WEST
EAST
12' SLINGS
(2)
PIVOT POINT CENTER LINE
4.66°
CG
35.05°
CHAIN FALLS

FIG 4

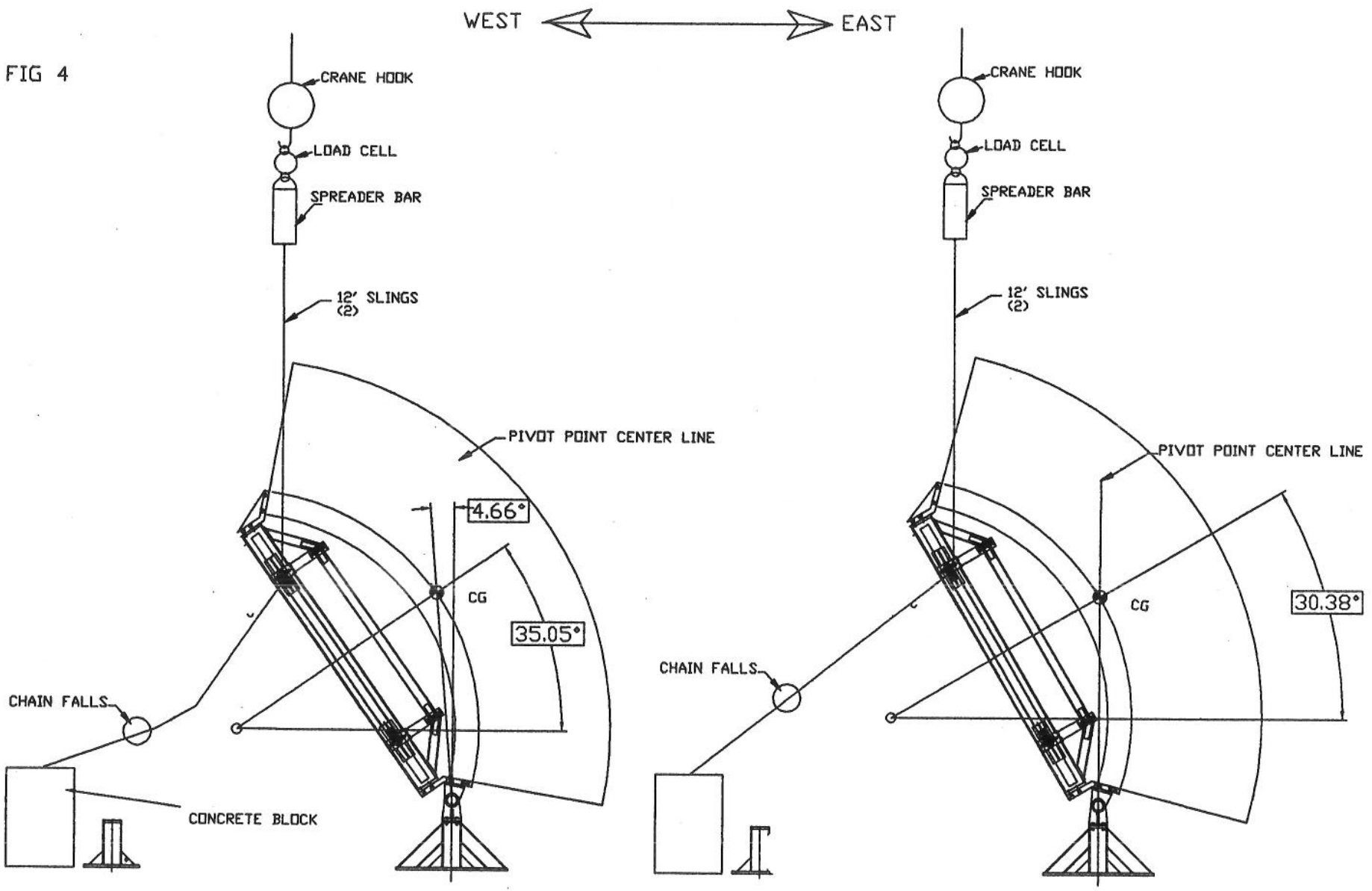

WEST
EAST
CRANE HOOK
LOAD CELL
SPREADER BAR
12' SLINGS (2)
PIVOT POINT CENTER LINE
4.66°
CG
35.05°
CHAIN FALLS
CONCRETE BLOCK
CRANE HOOK
LOAD CELL
SPREADER BAR
12' SLINGS (2)
PIVOT POINT CENTER LINE
CG
30.38°
CHAIN FALLS

FIG 5

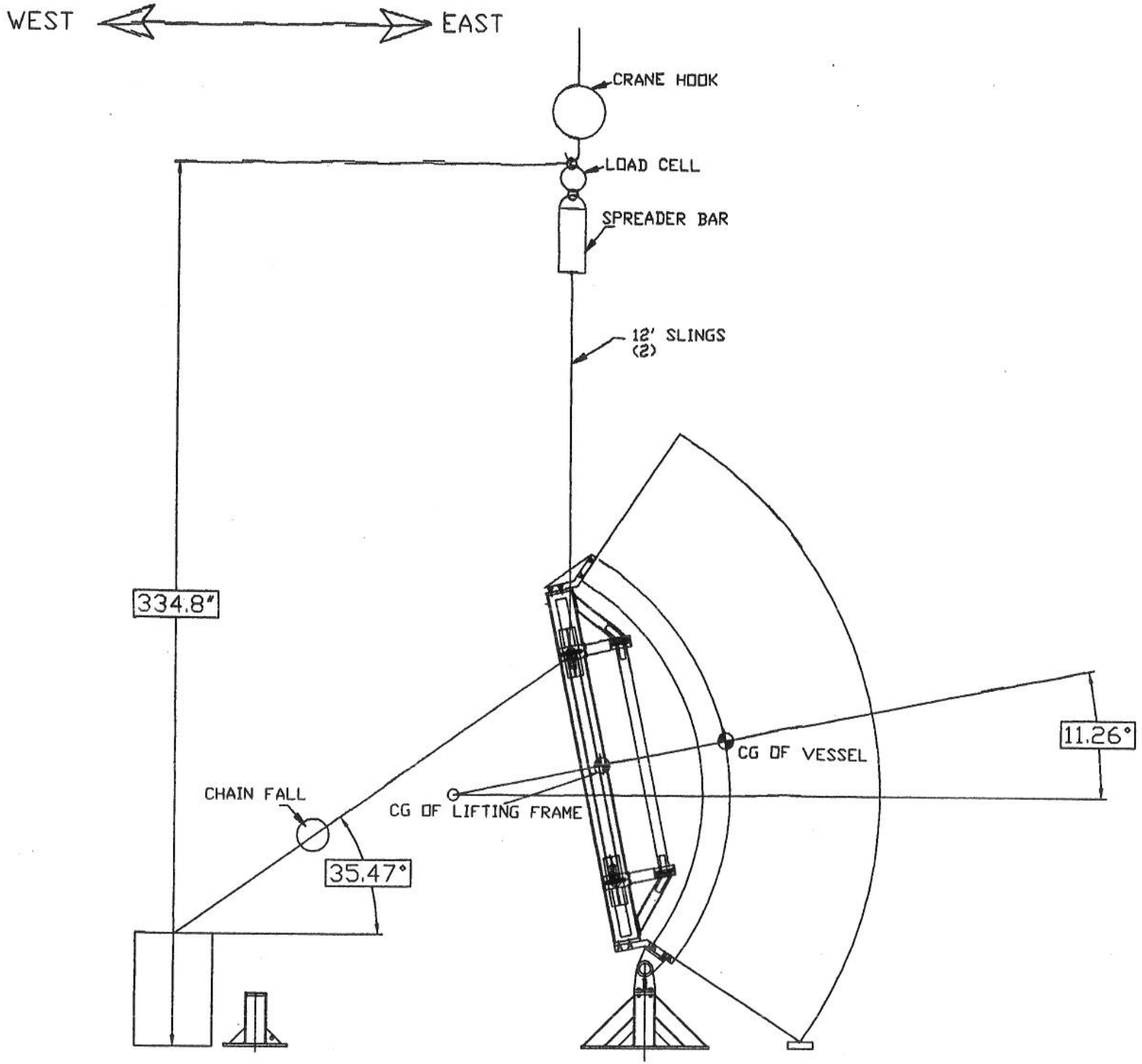
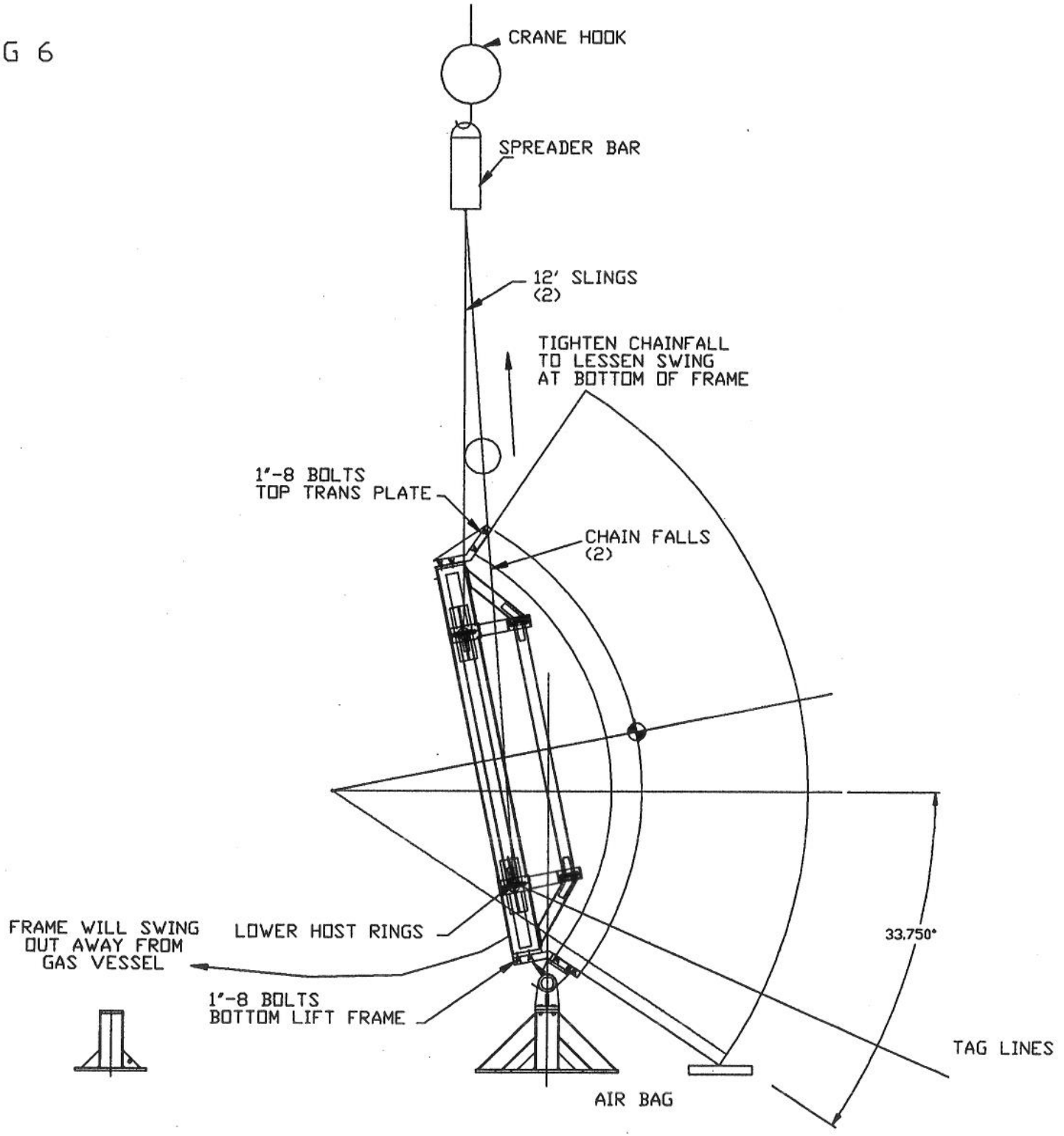
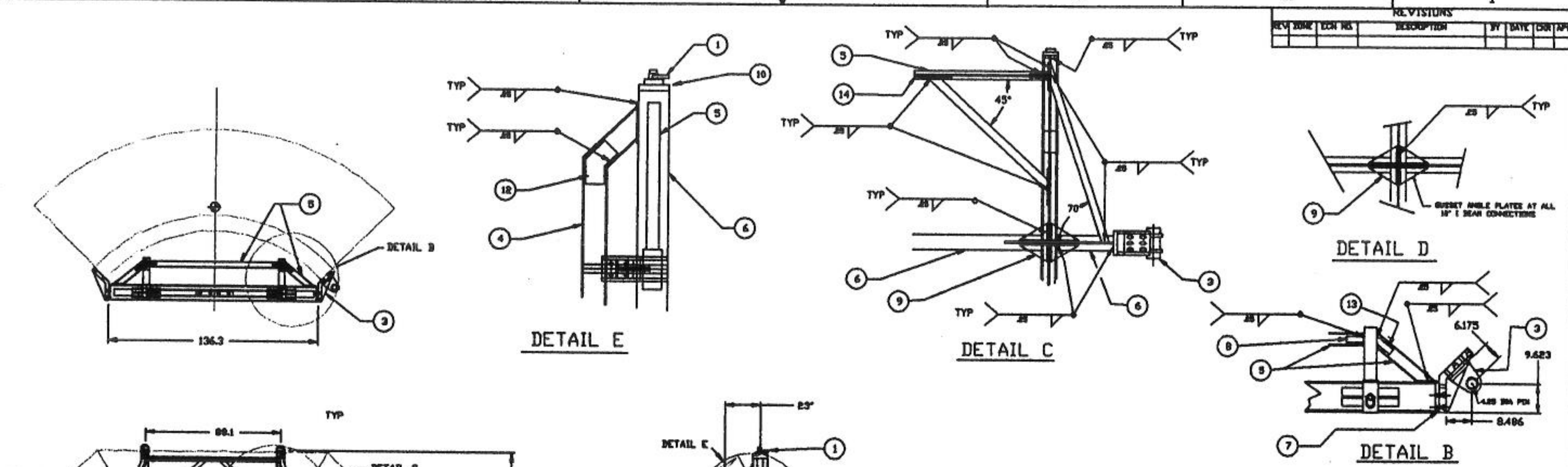
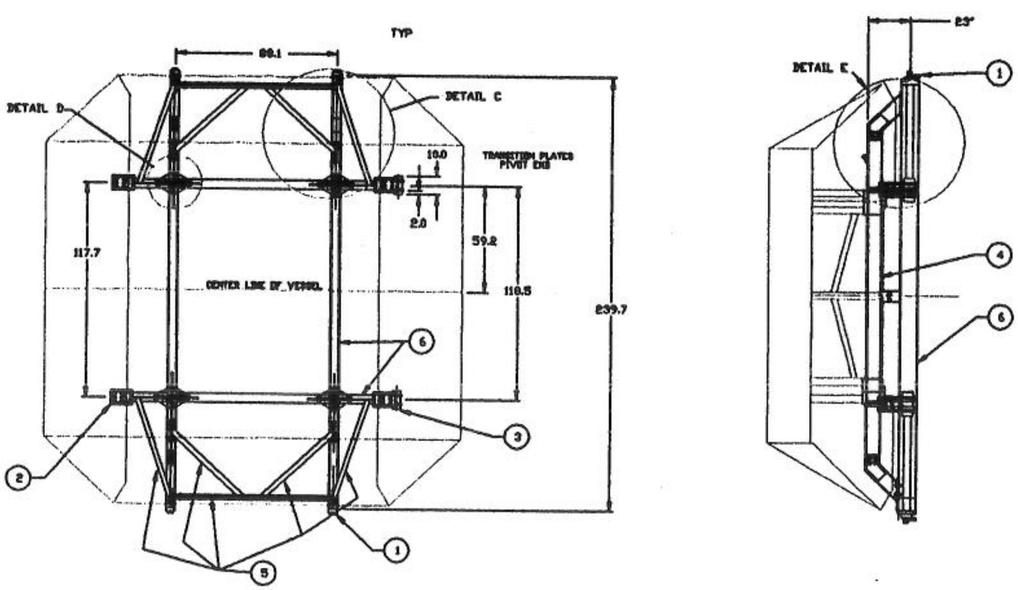

WEST
EAST
CRANE HOOK
LOAD CELL
SPREADER BAR
12' SLINGS
(2)
334.8"
CHAIN FALL
35.47°
CG OF LIFTING FRAME
CG OF VESSEL
11.26°

FIG 6


CRANE HOOK
SPREADER BAR
12' SLINGS
(2)
TIGHTEN CHAINFALL
TO LESSEN SWING
AT BOTTOM OF FRAME
1"-8 BOLTS
TOP TRANS PLATE
CHAIN FALLS
(2)
FRAME WILL SWING
OUT AWAY FROM
GAS VESSEL
LOWER HOST RINGS
1"-8 BOLTS
BOTTOM LIFT FRAME
33.750°
TAG LINES
AIR BAG





NOTES:

ESTIMATED WEIGHT OF LIFTING FIXTURE 3,500 POUNDS
ESTIMATED WEIGHT OF RICH 80,000 POUNDS

QTY	ITEM	DESCRIPTION	MATL
8	14	4" I BEAM WELD PLATES	ASTM A36
8	13	45~ ANGLE CLIPS 0020207019 SHEET 2	ASTM A36
4	12	8" I-BEAM CLIP 0020207019 SH 2	ASTM A36
4	11	TRANSITION I-BEAM END PLATE 0020207019 SHEET 2	ASTM A36
4	10	SWIVEL EYE END PLATE 0020207019 SHEET 2	ASTM A36
8	9	GUSSET ANGLE PLATES FULL WELD 0020207019 SH 2	ASTM A36
8	8	ANGLE CLIPS 0020207019 SHEET 2	ASTM A36
24	7	1"-8 SOCKET HEAD CAP SCREWS	ASTM A325
-	6	10 S I-BEAM	ASTM A36
-	5	4 S I-BEAM	ASTM A36
-	4	8 S I-BEAM	ASTM A36
2	3	PIVOT END TRANSITION PLATE 0020207018 PART 1	ASTM A514
2	2	TOP TRANSITION PLATE 0020207018 PART 2	ASTM A514
4	1	SWIVEL EYE RATED 10,000 LBS McMASTER CARR 1"-8 3052T66	ST
QTY	01	RICH LIFTING FRAME	MATL

INTERPRET IN GENERAL ACCORDANCE WITH ASME Y14.5M-1999

RICH

FLORIDA STATE UNIVERSITY
TALLAHASSEE, FLORIDA 32306-3016

D.ALCROOK
T. FRAWLEY
M.KENNEDY
M.KENNEDY
T.FRAWLEY

TITLE: RICH LIFTING FRAME WELDMENT AND ASSEMBLY

SIZE: D | DRAWING NUMBER: 0020207019 | REV: A

of 2